

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **Koji DEMACHI**

Art Unit: **2461**

Application Number: **10/584,106**

Examiner: **Omer S. Mian**

Filed: **June 22, 2006**

Confirmation Number: **3912**

For: **COMMUNICATION CONTROL SYSTEM**

Attorney Docket Number: **091611**

Customer Number: **38834**

SUBMISSION OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

July 18, 2011

Sir:

Appellants submit herewith an Appeal Brief in the above-identified U.S. patent application.

Attached please find our payment in the amount of \$540.00 to cover the cost for the Appeal Brief. If any additional fees are due in connection with this submission, please charge Deposit Account No. 50-2866.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL BRIEF FOR THE APPELLANT

Ex parte Koji DEMACHI et al. (Appellants)

COMMUNICATION CONTROL SYSTEM

Application Number: 10/584,106

Filed: June 22, 2006

Appeal No.:

Art Unit: 2461

Examiner: Omer S. Mian

Submitted by:
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July 18, 2011

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Art Unit: 2461

Appeal Brief
Attorney Docket No.: 091611

BRIEF ON APPEAL

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(I) REAL PARTY IN INTEREST

The real party in interest is **YOKOGAWA ELECTRIC CORPORATION**, by an assignment recorded in the U. S. Patent and Trademark Office on **June 22, 2006**, at Reel **018071**, Frame **0601**.

(II) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellant, appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(III) STATUS OF CLAIMS

This is an appeal from the Examiner's Advisory Action, dated March 30, 2011, wherein claims 1-4, 6-11, 14, 15 and 17-21 were rejected.

Claims 1-4, 6-11, 14, 15 and 17-21 are pending in the present application.

Claims 1-4, 6-11, 14, 15 and 17-21 are appealed. Claims 1-4, 6-11, 14, 15 and 17-21 are set forth in their entirety in the Claims Appendix included in this Brief on Appeal.

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(IV) STATUS OF AMENDMENTS

No claims were amended, cancelled, or added subsequent to the Final Office Action dated
December 16, 2010.

(V) SUMMARY OF THE CLAIMED SUBJECT MATTER

Rejected claims 1-4, 6-11, 14, 15 and 17-21 are grouped and represented by the independently claimed subject matter of claim 1.

As recited in claim 1, Applicants presently claimed invention is directed towards a communication control system that controls a plant operation. (*See, e.g.*, [0001]-[0002]; Fig. 2)

The communication control system causes a communication station performing communication in accordance with a standard protocol to perform multiplex communication based on time division of a communication band. (*See, e.g.*, [0013], [0038]; Fig. 2)

The communication control system includes a time slot assignment section and a time-division multiplex section. (*See, e.g.*, [0039]; Fig. 2)

The time slot assignment section divides a communication cycle as a basic cycle of time division into time slots, and assigns a set of communication stations and a type of a communication section to each of the time slots. (*See, e.g.*, [0039]; Fig. 2)

The time-division multiplex communication section performs communication within a period of the time slot in accordance with the set of communication stations and type of communication section assigned by the time slot assignment section. (*See, e.g.*, [0041])

Each communication station is equipped with a timer section and a time-synchronous communication section. (*See, e.g.*, [0042]) The type of the communication section includes time-synchronous communication, non-cycle data communication, and cycle data communication. (*See, e.g.*, [0040])

The time-synchronous communication section performs time-synchronous communication by using the time slot in which the time-synchronous communication is assigned. When the time-synchronous communication section transmits a time-synchronous communication frame to each communication station, time of the timer section of each communication station and the time slots of all communication stations are synchronized. (*See, e.g.*, [0043]; Fig. 3)

The communication control system controls communications in an industrial application. The communication control system controls communications in a control bus connecting an operation monitoring apparatus and a controller, the operation monitoring apparatus operates and monitors the plant, and the controller controls the plant under the monitoring of the operation monitoring apparatus. (*See, e.g.*, [0001], [0002], [0044])

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-2, 6, 8-10 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2004/0223466 to *Schrader et al.* in view of U.S. Publication No. 2004/0179469 to *Attar et al.* further in view of AAPA (Fig. 1 and Page 2, line 2 – Page 3, line 5).

Claims 3-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied to claim 1 above further in view of U.S. Publication No. 2003/0110435 to *Wu et al.*

Claims 7, 11, 14 and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied to claim 1 above in view of U.S. Patent No. 6,021,124 to *Haarsten*, further in view of U.S. Publication No. 2004/0062278 to *Hadzic et al.*

Claims 17-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied in claim 1 above in view of U.S. Patent No. 5,541,919 to *Yong et al.*

(VII) ARGUMENT

The rejection of claims 1-2, 6, 8-10 and 21 under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2004/0223466 to *Schrader et al.* in view of U.S. Publication No. 2004/0179469 to *Attar et al.* further in view of APA (Fig. 1 and Page 2, line 2 – Page 3, line 5) should be reversed.

As discussed below, the Examiner mischaracterized the cited references and pending claim language and thereby failed to present a *prima facie* case of obviousness.

First, the Examiner impermissibly used claim 1 as a blue-print to reconstruct claim 1. “One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to duplicate the claimed invention.” *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988). The system described in *Schrader* does not include *non-cyclic* data communications. Plus, neither *Schrader*, nor ATTAR discloses a system for controlling/monitoring an *industrial plant*. Therefore, even assuming that the combination of SA meets all of the limitations except those allegedly disclosed in AAPA, it would not be obvious to control an industrial plant with the combined *Schrader* and ATTAR system (“SA system”). As acknowledge in the background section of this application (APA), large-scale industrial applications have different operational characteristics than conventional applications (*e.g.*, those described in SA).

Second, the combination of *Schrader* and ATTAR does not result in a communication control system that assigns the set of communication stations, the time-synchronous communication, the non-cycle data communication and the cycle data communication *to each of*

the time slots, as recited in claim 1. For example, even assuming ATTAR describes a form of non-cycle data communication in paragraph [0062], it does not necessarily follow that the combination of references *would assign this type of information along with the other information to each of the time slots*. To do so, the *Schrader* system would have to be completely redesigned. The Examiner has not addressed this in his Office Action. Therefore, even if one were to combine the references, the result would not be the presently claimed invention.

Third, the combination of references fails to disclose that when the time-synchronous communication section transmits a time-synchronous communication frame to each communication station, **time of the timer section of each communication station** and the time slots of all communication stations **are synchronized**.

Schrader does not describe this claim feature. Instead, *Schrader* discloses transmitting a master synchronization message. *Schrader* does not describe that **time** of the timer section of each communication station is synchronized. For example, paragraph [0012] of *Schrader* describes a "synchronization broadcast, by assigning a slot number ("k"), and a cycle number "j" for a slot and the maximum number of cycles "M(k)" for that time slot." What is missing from this description of the synchronization broadcast is a signal concerning **time synchronization**. What else is missing is that *Schrader* does not disclose that each of the communication stations has a timer section, as required by claim 1. Therefore, *Schrader* does not disclose the **time synchronization** recited in claim 1.

ATTAR does not describe this claim feature either. Instead, ATTAR describes **timing** synchronization of the access points and access terminals in paragraphs [0093] and [0135]. Thus,

ATTAR teaches away from the replacement of the timing synchronization with the time synchronizations. At the very least, ATTAR does not disclose **time** synchronization, as recited in claim 1. Although ATTAR does not go into any detail as to how the **timing** synchronization is achieved, in general, it can be achieved by introducing a synchronization code in a communication signal. Meanwhile, regarding **time** synchronization, *it is necessary to send time data in order to achieve the time synchronization.*

As explained above, **timing** synchronization is different from the claimed **time** synchronization. In the timing synchronization, for example, it is necessary to always adjust the timing to achieve the timing synchronization, which results in an increase in data traffic. Whereas, in the time synchronization, it is not necessary to adjust the timing while it is necessary to adjust the time, which results in the decrease in the data traffic as compared with the timing synchronization.

Moreover, in a plant operation control, the plant control is performed using time. The communication timing synchronization enables synchronization of the communication itself, but cannot perform the synchronization between the control timing and the communication timing. Whereas, the time synchronization can perform the synchronization between the control timing and the communication timing, leading to the improvement of plant control.

Therefore, even if one were to combine the references, the result would not be the presently claimed invention.

Fourth, *Schrader* does not disclose a time-division multiplex communication section that performs communication *within a period of the time slot* in accordance with the set of

communication stations and type of communication section assigned by the time slot assignment section.

Instead, *Schrader* merely describes the allocation of the bandwidth using time slots and slot cycles. See *Schrader* paragraph [0014] and Fig. 1. As shown in Fig. 1b, the bandwidth is allocated to the respective stations. Further, as described in paragraph [0005] (“Once a station has begun transmitting during its assigned time slot”) and claim 1, a station is configured to transmit in the assigned slot cycle of the assigned time slot. Accordingly, in *Schrader*, the assigned set of communication stations is not determined in the same bandwidth of the same time slot. The presently claimed invention requires performing communication within a period of the time slot. *Schrader* fails to disclose performing communication in the same slot cycle of the same time slot. Therefore, even if one were to combine the references, the result would not be the presently claimed invention.

Accordingly, Appellants submit that claim 1 is patentable over the above combination of references.

Also, claims 2, 6, 8-10 and 21 are patentable over the above combination of references by nature of dependency from claim 1.

Claims 3-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied to claim 1 above further in view of U.S. Publication No. 2003/0110435 to *Wu et al.*

Claims 7, 11, 14 and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied to claim 1 above in view of U.S. Patent No. 6,021,124 to *Haarsten*, further in view of U.S. Publication No. 2004/0062278 to *Hadzic et al.*

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Claims 17-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *SAA* as applied in claim 1 above in view of U.S. Patent No.5,541,919 to *Yong et al.*

Claims 3-4, 7, 11, 14, 15, and 17-20 depend from independent claim 1. These claims are patentable over the cited combination of references in view of the aforementioned remarks distinguishing claim 1.

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(VIII) CONCLUSION

If this paper is not timely filed, appellants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to Deposit Account No. 50-2866, along with any other additional fees that may be required with respect to this paper.

Respectfully submitted,

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(IX) CLAIMS APPENDIX

1. (Previously Presented): A communication control system for causing a communication station performing communication in accordance with a standard protocol to perform multiplex communication based on time division of a communication band, the communication control system controls a plant operation and comprises:

a time slot assignment section which divides a communication cycle as a basic cycle of time division into time slots, and assigns a set of communication stations and a type of a communication section to each of the time slots; and

a time-division multiplex communication section which performs communication within a period of the time slot in accordance with the set of communication stations and type of communication section assigned by the time slot assignment section,

wherein each communication station is equipped with a timer section and a time-synchronous communication section,

the type of the communication section includes time-synchronous communication, non-cycle data communication, and cycle data communication,

the time-synchronous communication section performs time-synchronous communication by using the time slot in which the time-synchronous communication is assigned,

when the time-synchronous communication section transmits a time-synchronous communication frame to each communication station, time of the timer section of each communication station and the time slots of all communication stations are synchronized,

said communication control system controls communications in an industrial application,
wherein

said communication control system controls communications in a control bus connecting
an operation monitoring apparatus and a controller,

said operation monitoring apparatus operates and monitors a plant, and

said controller controls the plant under the monitoring of said operation monitoring
apparatus.

2. (Original): The communication control system according to claim 1, wherein the
set of communication stations is generated by grouping the communication stations based on
addresses of the respective communication stations.

3. (Previously Presented): The communication control system according to claim 1
or 2, wherein the type of the communication section includes at least one of 1-to-N non-cyclic
data communication, 1-to-N cyclic data communication, 1-to-1 non-cyclic data communication
and 1-to-1 cyclic data communication.

4. (Original): The communication control system according to claim 3, wherein the
1-to-1 non-cyclic data communication is at least one of an acknowledge type communication
which is the 1-to-1 non-cyclic data communication and in which a receiving station returns an
acknowledgment to a transmitting station when the receiving station normally receives data, and

a negative acknowledge type communication which is the 1-to-1 non-cyclic data communication and in which the receiving station returns a negative acknowledgment to the transmitting station when the receiving section cannot receive the data normally.

5. (Cancelled).

6. (Original): The communication control system according to claim 1, wherein the communication section is a communication section for performing 1-to-N non-cyclic data communication, and

the communication section includes:

a data transmission section for broadcasting data packets to a group address as destinations of a plurality of communication stations; and

a data reception section for receiving a transmitted data packet when a destination address of the transmitted data packet is a group address to which the home communication station belongs.

7. (Original): The communication control system according to claim 1, wherein the communication section is a communication section for performing 1-to-N cyclic data communication, and

the communication section includes:

a data transmission section for broadcasting data packets in a fixed cycle to a group address as destinations of a plurality of communication stations;

a plurality of receive buffers each of which stores reception time of a received data packet and the data packet as a pair;

a packet reception section which attaches the reception time to the received data packet and sequentially stores the data packet one by one into the plurality of receive buffers when a destination address of the received data packet is a group address to which the home communication station belongs; and

a receive buffer reading section which reads the data packet from the receive buffer having the latest reception time among the plurality of receive buffers, completes readout in a period shorter than the cycle of the broadcasting, and sends the data packet to a higher-level side.

8. (Original): The communication control system according to claim 1, wherein the communication section is a communication section for performing 1-to-1 non-cyclic data communication and an immediate-response type communication, and

the communication section includes:

a data transmission section for transmitting a data packet to a single communication station, and retransmits the data packet in a case where a normal acknowledgment is not returned from a receiving station within a predetermined time; and

a data reception section for transmitting a normal acknowledgment when a data packet is normally received.

9. (Original): The communication control system according to claim 8, wherein the data transmission section retransmits the data packet independently of the time slot.

10. (Original): The communication control system according to claim 8, wherein the data reception section transmits the normal acknowledgment independently of the time slot.

11. (Previously Presented): The communication control system according to claim 1, wherein the communication section is a communication section for performing 1-to-1 non-cyclic data communication and a negative acknowledge type communication, and

the communication section includes:

a data transmission section for transmitting a data packet with a sequence number being attached, the sequence number being changed for each transmission; and

a data reception section which checks a sequence number being attached to a data packet each time the data packet is received, and transmits a negative acknowledgment packet to a transmitting station when detecting a lost sequence number as a result of checking,

wherein the data reception section attaches a sequence number specifying the data packet that is received normally at the latest to the negative acknowledgment packet,

when the data transmission section receives the negative acknowledgment packet, the data transmission section sequentially retransmits data packets starting with an undelivered data packet being specified by the sequence number attached to the negative acknowledgment packet,

when the data transmission section does not transmit a subsequent data packet for a predetermined time on completion of the transmission of the data packets, the data transmission section transmits a delivery acknowledgment packet to a receiving station, and when a sequence number specified by a returned acknowledgment packet does not indicate the last transmitted data packet, the data transmission section sequentially retransmits data packets starting with an undelivered data packet specified by the returned acknowledgment packet, and

when the data reception section receives the delivery acknowledgment packet, the data reception section returns to the transmitting station an acknowledgment packet to which a sequence number specifying the last received data packet is attached.

12-13. (Cancelled).

14. (Previously Presented): The communication control system according to claim 11, wherein the data reception section performs transmission of the negative acknowledgment packet and the acknowledgment packet independently of the time slot.

15. (Previously Presented): The communication control system according to claim 1, wherein the communication section is a communication section for performing 1-to-1 cyclic data communication, and

the communication section includes:

a transmission requesting section for requesting cyclic transmission of a data packet addressed to a specified communication station by a start request packet, based on a data acquisition request;

a halt requesting section for requesting a halt of cyclic transmission of the data packet by a halt request packet;

a data transmission section which, when receiving the start request packet, starts transmission of a data packet being specified by the start request packet to a communication station of a requesting source in a cycle specified by the start request packet, and halts transmission of the data packet on receiving a halt request packet; and

a data reception section for receiving the data packet,

wherein the data reception section includes:

a plurality of receive buffers each of which stores reception time of the received data packet and the data packet as a pair;

a packet reception section which attaches the reception time to the received data packet and sequentially stores the data packet one by one into the plurality of receive buffers; and

a receive buffer reading section which reads the data packet from the receive buffer having the latest reception time among the plurality of receive buffers, completes readout in a period shorter than the cycle specified by the start request packet, and sends the data packet to a higher-level side.

16. (Cancelled)

17. (Previously Presented): The communication control system according to claim 1, which performs time-division multiplex communication by using the time slots, the communication control system comprising:

a plurality of transmission queue sections which exists between predetermined layers of an OSI layer model, is provided for each type of communication and constitutes a queue of transmission packets;

a plurality of reception queue sections which exists between predetermined layers of the OSI layer model, is provided for each type of the communication and constitutes a queue of reception packets;

a transmission section for transmitting packets in the plurality of transmission queue sections in accordance with a predetermined priority order with priority information corresponding to the transmission queue section being attached;

a reception section for distributing and storing received packets in the plurality of reception queue sections in accordance with the priority information; and

a reading section which reads data stored in the plurality of reception queue sections in accordance with a predetermined priority order, and sends the data to a higher-level side.

18. (Original): The communication control system according to claim 17, wherein the transmission section executes transmission processing of specific transmission queue section

among the plurality of transmission queue sections in a case where data does not exist in the transmission queue section that has higher priority over the specific transmission queue section.

19. (Original): The communication control system according to claim 17, wherein the reading section executes reading processing of specific reception queue section among the plurality of reception queue sections in a case where data does not exists in the reception queue section that has higher priority over the specific reception queue section.

20. (Previously Presented): The communication control system according to any one of claims 17-19, wherein the transmission queue section and the reception queue section exist between a second layer and a third layer of an OSI layer model.

21. (Previously Presented): The communication control system according to claim 1, wherein the standard protocol is UDP or IP.

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(X) EVIDENCE APPENDIX

n/a

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(XI) RELATED PROCEEDINGS APPENDIX

n/a